



Future of ocean mapping, hydrography, policy and public perception

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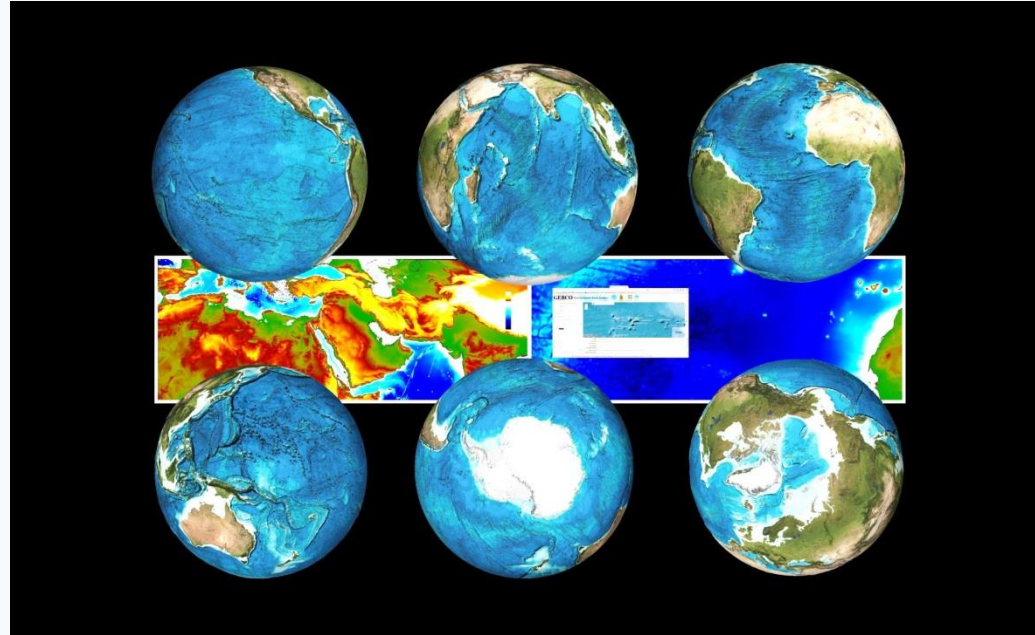


OUTLINE

- **Current status of Ocean Mapping**
- **Ongoing Ocean Mapping Activities**
- **New Initiatives (Seabed 2030)**
- **Things To Do**
- **Role of the Parent Organizations (IHO and IOC)**
- **Role of the GEBCO Community and Outreach**
- **Role of the UN and Other International Organizations/Institutions**
- **Industry and Academia support**
- **Conclusion**



Current status of Ocean Mapping



Deep Ocean (+200m deep) - less than 10% has been measured directly
(depths from echo sounders more than 60 miles apart)

Coastal waters > 50% unsurveyed

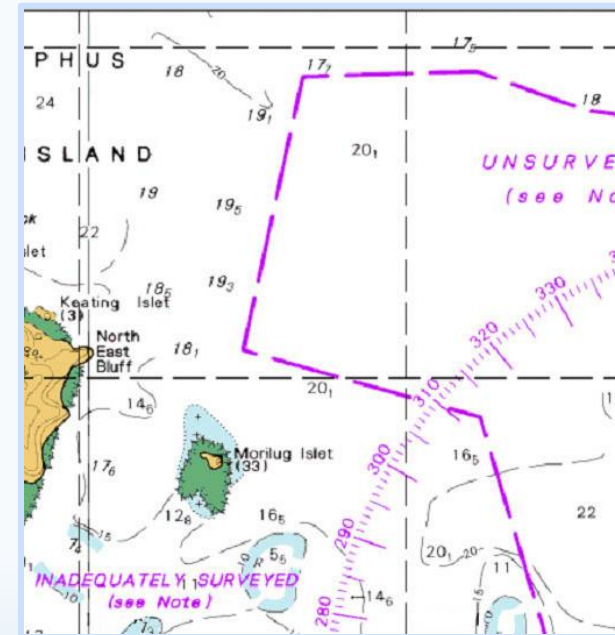


Survey and charting status 2016

(source: IHO C-55)

Unsurveyed or requires better data (0-200m deep)

- SW Pacific >95%
- Polar regions > 95%
- W. Africa >80%
- Caribbean >80%
- Australia ~ 65%
- USA ~ 40%
- UK 30%
- France 19%

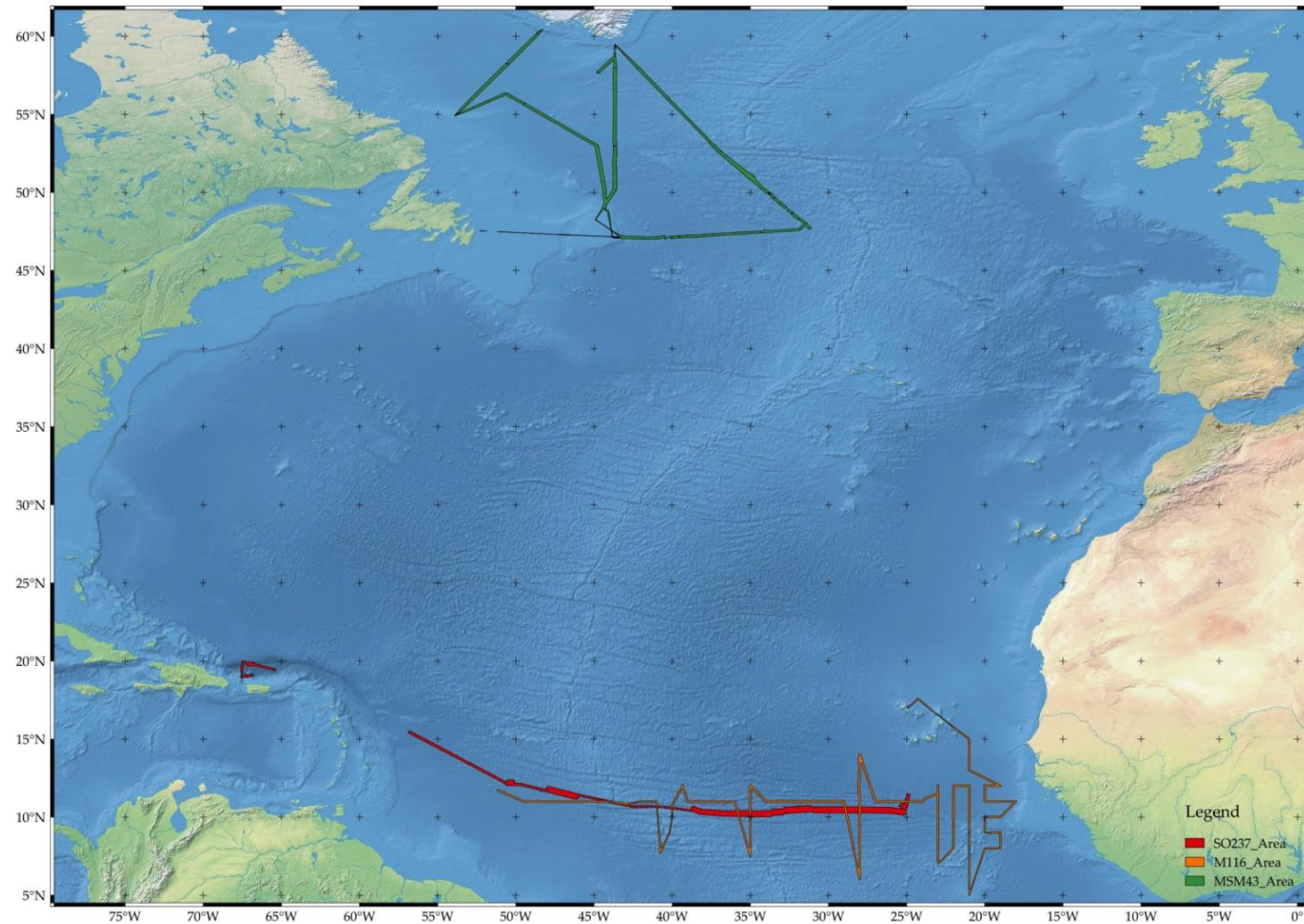


Ongoing Mapping Activities (Addition to GEBCO Project)

- **A North Atlantic Seabed Mapping Project had been established under the Atlantic Ocean Research Alliance (AORA)** and resulting from the Galway Statement, which was an outcome of the Conference on “The Atlantic – A Shared Resource” held in Galway, Ireland, from 23 to 24 May 2013, with representatives of the European Union, the United States and Canada agreeing to join forces on Atlantic Ocean Research.
- The goal is to better understand the Atlantic Ocean and promote the sustainable management of its resources. The Galway Statement aims to connect the ocean observation efforts of the three partners. The work will also study the interplay of the Atlantic Ocean with the Arctic Ocean, particularly in relation to climate change
- AORA website (<http://www.atlanticresource.org>)



North Atlantic Seabed Mapping Project



Ongoing Mapping Activities

- **Atlantic Seabed Mapping International Working Group (ASMIWG) meets regularly and receives presentations and reports from the participants:**
- European Ocean Observing System (EOOS), which is part of the Global Ocean Observing System (GOOS) of the Intergovernmental Oceanographic Commission (IOC) of UNESCO,
- the seabed mapping work undertaken by [Instituto Geológico y Minero de España](#) (IGME) off the south west coast of Spain,
- the Marine Institute of Ireland (INFOMAR), the Canadian Coast Guard , the German Leibniz Institute of Marine Sciences (IFM-GEOMAR).
- NOAA/National Centers for Environmental Information (NCEI) on progress with developments to the IHO Data Centre for Digital Bathymetry (DCDB) and the North Atlantic Data Viewer
- Ocean Literacy WG, the European Marine Observation and Data Network (EMODnet),
- International Research Ship Operators (IRSO),
- IHO Crowd-Sourced Bathymetry Working Group,
- the GEBCO Seabed 2030 Project,
- “A Trans-Atlantic assessment and deep-water ecosystem-based spatial management plan for Europe” (ATLAS)
- “Deep-sea Sponge Grounds Ecosystems of the North Atlantic” (SponGES),
- Atlantic Seafloor Partnership for Integrated Research and Exploration (ASPIRE),
- Atlantic Canyons Undersea Mapping Expeditions (ACUMEN)
- Atlantic Ocean Research Alliance Coordination and Support Action (AORA CSA).



Seabed 2030

GEBCO *Seabed 2030* Goal:

- no seabed feature larger than 100 m goes undiscovered by 2030



Role of the Parent Organizations (IHO and IOC)



United Nations
Educational, Scientific and
Cultural Organization

Organisation
des Nations Unies
pour l'éducation,
la science et la culture

Organización
de las Naciones Unidas
para la Educación,
la Ciencia y la Cultura

Организация
Объединенных Наций по
вопросам образования,
науки и культуры



Intergovernmental
Oceanographic
Commission

Commission
océanographique
intergouvernementale

Comisión
Oceanográfica
Intergubernamental

Межправительственная
океанографическая
комиссия

Role of the IHO

- **Raising Awareness on lack of ocean mapping**
- **IHO CL 11/2016** - Request For Shallow Water Bathymetric Data
- **IHO CL 9/2016**- IHO Publication C-16: National Hydrographic Regulations – Request for updated information;
- Inputs provided by Member States, including any regulations covering government rights of access to bathymetric data collected for commercial or scientific purposes, will allow a subsequent new edition of C-16 to be published by the IHO.



IHO Assembly Decision No.21: The Assembly endorsed the following IHO Resolution: Improving the Availability of Bathymetric Data Worldwide

- a. active participation in and contribution to the marine element of national Spatial Data Infrastructures (MSDI);
- b. continued support for the IHO-IOC GEBCO project and the IHO Data Centre for Digital Bathymetry;
- c. encouraging the scientific and the commercial sector to identify and wherever possible make available for secondary use, data collected or being collected for a specific scientific or commercial purpose;
- d. supporting systems and infrastructures, such as MSDI and the IHO DCDB, that facilitate data discovery, thereby avoiding unnecessary duplication in bathymetric data collection;
- e. encouraging supplementary methods for collecting bathymetric data, including, but not limited to:
 - (1) Crowd-Sourced Bathymetry,
 - (2) Satellite Derived Bathymetry,
 - (3) The use of autonomous vehicles for the collection of environmental data including bathymetry.



World Hydrography Day (WHD) Themes:

In addition to raising awareness of the wide potential uses of hydrographic data in general, WHD themes are used in particular to raise awareness of the current lack of comprehensive data to underpin many maps and charts of the seas and oceans.

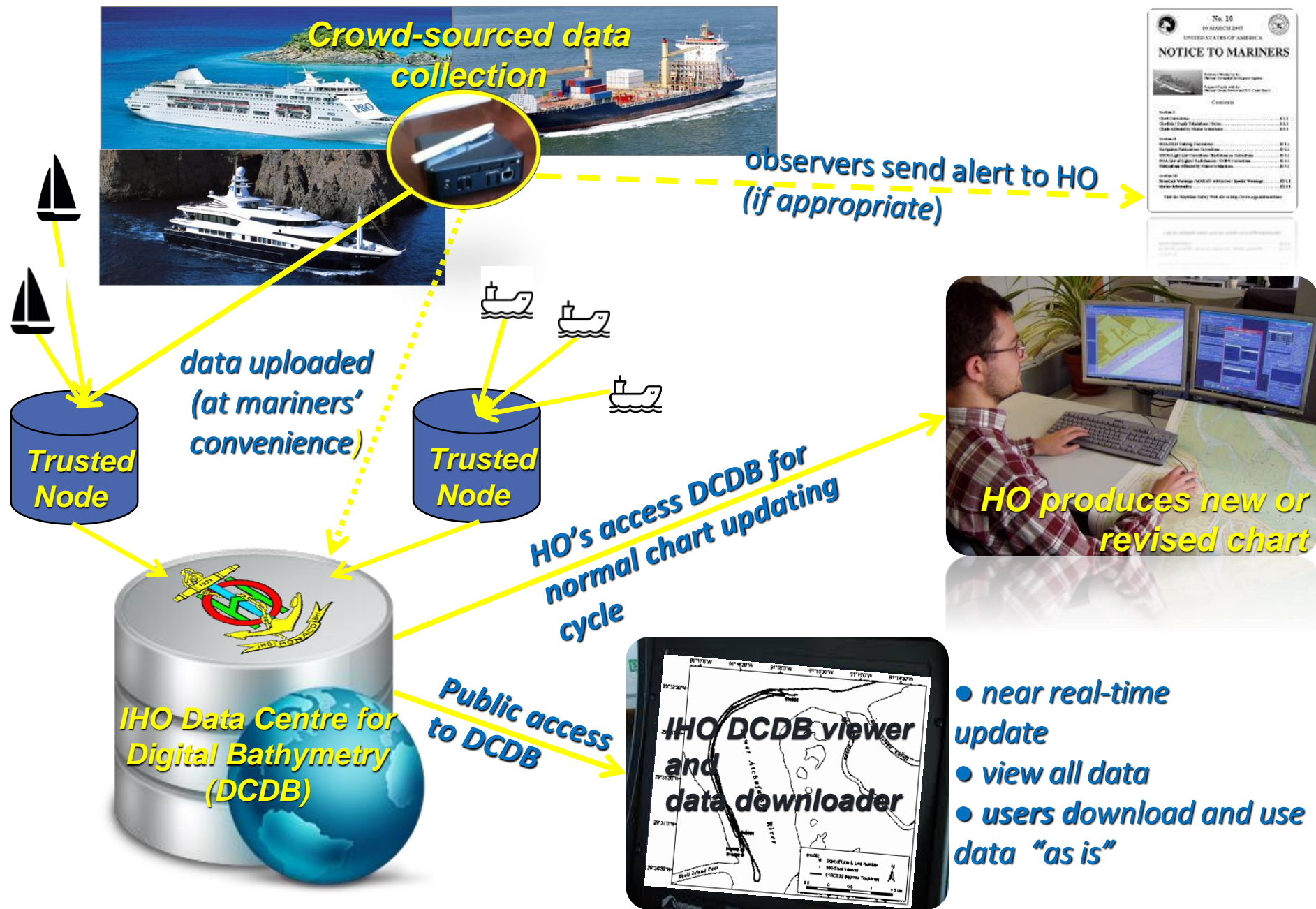
- 2014: *Hydrography - much more than just nautical charts*
- 2015: *Our seas and waterways - yet to be fully charted and explored*
- 2016: *Hydrography - the key to well-managed seas and waterways*
- 2017: *Mapping our seas, oceans and waterways - more important than ever*
- **2018: *Bathymetry – the foundation for sustainable seas, oceans and waterways***



IRCC Permanent Agenda Item

- ***Data gathering and Management, Maximizing the use of Hydrographic Data***
- *Docs: IRCC9-10A Update on Data Gathering and Management, Maximizing the use of Hydrographic Data (Secretariat)*





Proposal to support the Seabed 2030 initiative by inviting willing IHO MS to inform the RENC's of their desire that S-57 data in their ENC's be made available to the IHO DCDB

- by Norway supported by Germany, New Zealand, Sweden and USA.
- If IHO MS that distribute their ENC's through a RENC, would allow their S-57 data, already available in the RENC-system, to be distributed also to the IHO DCDB, we can make a genuine contribution to the important but ambitious Seabed 2030 project.



The Role of the IOC

- The IOC Assembly enthusiastically supported the proposed “*Decade of Ocean Science for Sustainable Development*” and requested the Executive Secretary to highlight the resolution to the UN General Assembly with a view of establishing the Decade under the auspices of the UN for the period 2021-2030 and to encourage as wide as possible support for the objectives and expected outcomes.
- The IOC Assembly also considered the report of the Chair of the GGC and expressed its support to *the increased IOC engagement in the work of GEBCO activities*. Following the GEBCO review process conducted in 2015–2016 by the IOC, and the decision of IOC Member States to strengthen IOC’s contribution to GEBCO, a budget line was proposed in the draft programme and budget of the Commission and ultimately endorsed by the IOC Assembly.
- The Assembly also welcomed “Seabed 2030 initiative and thanked the Nippon Foundation for its support for this new initiative.
- *GEBCO should be more visible in IOC activities.*



Role of the GEBCO Community and Outreach Activities

- All GEBCO colleagues should be pro-active to promote and advertise the ocean mapping activities at all platforms.
- New outreach events like “Forum of Future Ocean Floor Mapping” should be organized in the future,
- **GEBCO Outreach Working Group:**
 - In harmony with the Seabed 2030 general goals for outreach, the focus should be to attract more involvement in ocean mapping and promote awareness of GEBCO activities. The WG should compile an outreach worksheet containing ideas and prioritize activities based on their impact, effectiveness, required resources, costs and timelines. Identified actions should develop a mechanism to gather user information, develop an outreach website and develop the outreach ideas spread sheet.



UN Nations Organs

- **UN Ocean Conference 2017**



- **UN-GGIM (United Nations Committee of Experts on Global Geospatial Information Management)**

- **The International Seabed Authority (ISA)**



Other International Organizations/Institutions

- **Our Ocean Conference**
- **The Group on Earth Observations (GEO)**
- **The World Ocean Council (WOC)**
- **The Open Geospatial Consortium (OGC)**



Industry and Academia support

- Informal discussion between the IHO Secretariat and several representatives of industry and academia that participate in IHO activities either as Expert contributors or as Observers indicates that survey data collected for a variety of scientific and commercial purposes could be more widely used.
- Commercial survey companies enter into contracts both with Government departments and with commercial entities to undertake surveys that, if not solely hydrographic, at least contain a bathymetric element. The surveying companies render the collected data solely to their clients as they are contractually obliged to do, but in the knowledge that, whilst meeting the needs of the task, all or parts of the data could be exploited for much wider use and benefit. It is estimated that no more than 20% of the bathymetric data collected commercially during surveys for specific projects is made available to Hydrographic Offices for inclusion in charts or for wider uses.
- Similarly, bathymetric data collected for scientific purposes often suffers a similar fate to commercially collected data, in that it is used for its primary purpose and then either archived or abandoned. In many cases, the existence of the data is difficult to discover. In addition, scientific vessels that are equipped to collect bathymetry, most often only collect data in the specific area of scientific interest. The concept of passage sounding is not widely understood or incorporated into voyage planning.



Conclusions

- *Any data is better than no data,*
- **Coordinate the global effort to map the ocean floor,**
- **Increase government and public awareness of the importance of bathymetry in supporting all human activity in, on or under the sea,**
- **Global efforts to improve the collection, quality and availability of hydrographic data worldwide should be pursued by the IHO, IOC and GEBCO community as a constant objective,**
- **Data gathering, management and maximizing the use of hydrographic data should be one of the focus areas by the hydrographic and oceanographic community,**
- **There are a number of international collaborative initiatives to gather bathymetric data, of which IHO-IOC GEBCO is not directly involved or engaged. It is clear there is an opportunity for GEBCO to take the lead in the assessing and processing of the data gathered during the transits as well as any data collected from the pilot project. There are also opportunities for GEBCO trained personnel to gain valuable experience gathering deep water ocean bathymetry.**



Conclusions

- Continue gather data, wherever and whenever
- Refine upload and download portals on DCDB
- Develop IHO guidelines to assess CSB data quality for use in charts
- Collect more data sets and explore methods for quantifying uncertainty values
- Engage to all available stakeholders. commercial organizations already established in order to receive more data



What can we do?

- **Increase bathymetric data collection**
 - ↳ encourage holistic governmental survey and data gathering programmes
 - set priorities
 - collect once - use many times
 - share/pool resources
- **Unlock existing data**
 - ↳ make existing data collected for scientific or commercial purposes discoverable
- **Crowd-sourcing by mariners and scientists**
 - ↳ collect data on all voyages, whenever possible



Thank you!

